

What Is Claimed Is:

1. A balloon catheter comprising a balloon and a plurality of tubular members,

wherein a Shore hardness of a material configuring the outermost surface of at least that portion of said first tubular member where said balloon is fused is lower than the Shore hardness of a material configuring said balloon.

2. A balloon catheter comprising a balloon and a plurality of tubular members;

wherein said balloon catheter has a structure in which a first tubular member having as one purpose thereof to allow a slidable guide wire to pass through the interior thereof is deployed passing through the interior of said balloon, and said balloon and the outer surface of said first tubular member are fused

concentrically in the vicinity of the distal end of said catheter; and

wherein flexural modulus of a material configuring the outermost surface of at least that portion of said first tubular member where said balloon is fused is lower than the flexural modulus of a material configuring said balloon.

3. A balloon catheter comprising a balloon and a plurality of tubular members,

wherein said balloon catheter has a structure in which a first tubular member having as one purpose thereof to allow a slidable guide wire to pass through the interior thereof is deployed passing through the interior of said balloon, and said balloon and the outer surface of said first tubular member are fused concentrically in the vicinity of the distal end of said catheter; and

wherein melting point of a material configuring the outermost surface of at least that portion of said first tubular member where said balloon is fused is lower than the melting point of a material configuring said balloon.

4. The balloon catheter according to any one of claims 1 to 3, wherein said balloon is made from a polyester elastomer material, and the outermost surface of at least that portion of said first tubular member

where the balloon is fused is made from a polyester elastomer material.

5. The balloon catheter according to any one of claims 1 to 3, wherein said balloon is made from a polyamide elastomer material; and the outermost surface of at least that portion of said first tubular member where the balloon is fused is made from a polyamide elastomer material.

6. A balloon catheter comprising a balloon and a plurality of tubular members,

wherein said balloon catheter has a structure in which a first tubular member having as one purpose thereof to allow a slidable guide wire to pass through the interior thereof is deployed passing through the interior of said balloon, and said balloon and outer surface of said first tubular member are secured concentrically in the vicinity of the distal end of said catheter,

wherein said securing is done by thermally fusing said balloon and a material miscible with said first tubular member, or said balloon and a material that chemically reacts with said first tubular member, as a direct securing layer, or as at least one layer when securing portion is made multi-layer; and

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wherein Shore hardness of a material configuring the layer adjacent to said balloon is lower than the Shore hardness of a material configuring said balloon.

7. A balloon catheter comprising a balloon and a plurality of tubular members,

wherein said balloon catheter has a structure in which a first tubular member having as one purpose thereof to allow a slidable guide wire to pass through the interior thereof is deployed passing through the interior of said balloon, and said balloon and outer surface of said first tubular member are secured concentrically in the vicinity of the distal end of said catheter;

wherein said securing is done by thermally fusing said balloon and a material miscible with said first tubular member, or said balloon and a material that chemically reacts with said first tubular member, as a direct securing layer, or as at least one layer when securing portion is made multi-layer; and

wherein flexural modulus of a material configuring the layer adjacent to said balloon is lower than the flexural modulus of a material configuring said balloon.

8. A balloon catheter comprising a balloon and a plurality of tubular members,

wherein said balloon catheter has a structure in which a first tubular member having as one purpose

thereof to allow a slidable guide wire to pass through the interior thereof is deployed passing through the interior of said balloon, and said balloon and outer surface of said first tubular member are secured concentrically in the vicinity of the distal end of said catheter;

wherein said securing is done by thermally fusing said balloon and a material miscible with said first tubular member, or said balloon and a material that chemically reacts with said first tubular member, as a direct securing layer, or as at least one layer when securing portion is made multi-layer; and

wherein melting point of a material configuring the layer adjacent to said balloon is lower than the melting point of a material configuring said balloon.

9. The balloon catheter according to any one of claims 6 to 8, wherein said balloon is made from a polyester elastomer material; and the material configuring the layer of said first tubular member adjacent to said balloon is made from a polyester elastomer material.

10. The balloon catheter according to any one of claims 6 to 8, wherein said balloon is made from a polyester elastomer material; and the material configuring the layer of said first tubular member

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adjacent to said balloon is made from a polyamide elastomer material.

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a1 11. The balloon catheter according to claim 4, 5, 9, or 10, wherein said polyester elastomer material or said polyamide elastomer material has a hard segment and a soft segment in its molecule; and ratio of soft segment in the material configuring said balloon is adjusted to be less than the ratio of soft segment in the material configuring the outermost surface of said first tubular member or the material configuring the layer thereof adjacent to said balloon.

12. The balloon catheter according to claim 11, wherein: said polyester elastomer material is a polyester elastomer having a hard segment and a soft segment in its molecule; and ratio of said soft segment is adjusted to be larger than 13%.

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a2 13. The balloon catheter according to claim 11, wherein said polyamide elastomer material is a polyamide elastomer having a hard segment and a soft segment in its molecule; and the ratio of said soft segment is adjusted to be larger than 14%.

14. The balloon catheter according to any one of claims 1 to 13, wherein the innermost surface of said first tubular member is configured from a high-density polyethylene.

15. The balloon catheter according to claim 14, wherein said first tubular member exhibits a multi-layer structure having two or more layers; the outermost surface thereof is configured from a polyamide elastomer or polyester elastomer; the innermost surface thereof is configured from a high-density polyethylene; and one or more binder layers are present between the outermost surface layer and the innermost surface layer.

16. The balloon catheter according to any one of claims 1 to 15, wherein said balloon is made from a polymer blend material of a first polymer component and a second polymer component that are each thermoplastic elastomers having a hard segment and a soft segment; said first polymer component has a higher Shore hardness than said second polymer component; and both said first polymer component and said second polymer component are thermoplastic elastomers having hard segments with same repeating unit structure and soft segments with same repeating unit structure.

17. The balloon catheter according to claim 16, wherein Shore hardness of said first polymer component is D70 or greater, and Shore hardness of said second polymer component is less than D70.

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64 18. The balloon catheter according to claim 16 or 17, wherein said first polymer component and said second polymer component are polyester elastomers.

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19. The balloon catheter according to claim 16 or 17, wherein said first polymer component and said second polymer component are polyamide elastomers.

20. The balloon catheter according to any one of claims 16 to 19, wherein said first polymer component(A) and said second polymer component (B) are blended in a weight ratio of (A)/(B) = 98/2 to 10/90.

21. The balloon catheter according to any one of claims 1 to 20, wherein said first tubular member is deployed to pass through the interior of said balloon, and the balloon catheter has such structure that said balloon and the outer surface of said first tubular member are concentrically fused near the distal end of said catheter; and a second tubular member configuring the outer surface of said catheter is made from a material that can be fused with said balloon, and is deployed and connected on the proximal side of said balloon.

22. The balloon catheter according to claim 21, wherein said balloon has a straight tube part; proximal-side and distal-side tapered parts, whose diameters gradually narrow, adjacent to either end of said straight tube part; and proximal-side and distal-side sleeve parts adjacent to the opposite ends of said tapered parts; at least one of said distal-side sleeve part and said proximal-side sleeve part has a shape such that part of

the taper start position adjacent to that sleeve part is shifted in longitudinal axial direction; the inner surface of that distal-side sleeve and the outer surface of said first tubular member are joined together; and said proximal-side sleeve part and the end of said second tubular member are joined together.

23. The balloon catheter according to claim 22, wherein the shift in longitudinal axis direction of said taper start position adjacent to said sleeve part is adjusted within a range of 0.3 mm to 10.0 mm.

24. The balloon catheter according to claim 21, wherein said balloon has a straight tube part; proximal-side and distal-side tapered parts, whose diameters gradually narrow, adjacent to either end of said straight tube part, and proximal-side and distal-side sleeve parts adjacent to the opposite ends of said tapered parts; the angle of inclination of said tapered part in at least one of said distal-side tapered part and said proximal-side tapered part is made to vary around the circumferential direction; the inner surface of said distal-side sleeve and the outer surface of said first tubular member are joined together; and said proximal-side sleeve part and the end of said second tubular member part are joined together.

25. The balloon catheter according to claim 24, wherein difference between the maximum and minimum values

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of said angle of inclination is adjusted within a range of 2° to 30°.

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AS 26. The balloon catheter according to any one of claims 22 to 26, wherein length of said straight tube part in longitudinal axis direction is adjusted within a range of 8 mm to 80 mm.

27. The balloon catheter according to any one of claims 1 to 26, wherein said balloon catheter is a rapid exchange type balloon catheter having a structure in which the proximal end of said first tubular member is opened midway along the catheter shaft.

28. The balloon catheter according to any one of claims 1 to 27, wherein the leading end part of said balloon catheter comprising said balloon is protected by a protective device comprising a protective pipe part for protectively covering said leading end part comprising said balloon, and a coupling adapter for coupling with a flushing fluid supplying instrument so as to be freely detachable.

29. The balloon catheter according to claim 28, wherein said coupling adapter is provided with a coupling port in which the barrel end of a hypodermic syringe that is a flushing fluid supplying instrument is inserted and held so as to be freely detachable.

30. The balloon catheter according to claim 28, wherein said coupling adapter comprises a Luer taper lock

fitting connector for coupling to a flushing fluid supplying instrument.

31. The balloon catheter according to claim 28, wherein said coupling adapter is provided with a coupling port in which a hypodermic needle holding member is inserted and held so as to be freely detachable.

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